

REMARKS

Favorable consideration and allowance are respectfully requested for claims 1-7 in view of the foregoing amendments and the following remarks.

In the Office Action dated March 15, 2002, claims 3-6 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite; claim 7 was rejected under 35 U.S.C. § 102(e), as being anticipated by U.S. Patent No. 6,004,377 ("Tamata"); claims 1, 3, and 4 were rejected under 35 U.S.C. § 103(a), as being unpatentable over U.S. Patent No. 5,785,741 (the "'741 patent") in view of U.S. Patent No. 4,838,904 ("Sanders") and U.S. Patent No. 5,855,647 (the "'647 patent"); and claims 2, 5, and 6 were rejected under 35 U.S.C. § 103(a), as being unpatentable over the '741 patent in view of Sanders and '647 patent and further in view of Tamata. These rejections are traversed. It is respectfully requested that claims 1-7 be allowed.

Rejection under 35 U.S.C. § 112, second paragraph

Claims 3-6 have been amended to clarify any antecedent basis issues; it is requested that the rejection of these claims be withdrawn.

Rejection under 35 U.S.C. § 102(e)

Claim 7 was rejected under 35 U.S.C. § 102(e), as being anticipated by Tamata. Tamata discloses a system using filters filled with adsorbents to remove impurities from SF₆. On the other hand, claim 7 recites a system including a mobile membrane separation apparatus. That is, the claimed system

does not employ filtration using adsorbents, rather separates components of a mixture through the use of a membrane separation apparatus. Thus, Tamata does not anticipate claim 7. As such, it is respectfully requested that the rejection of claim 7 be withdrawn.

Rejection under 35 U.S.C. § 103(a)

Claims 1, 3, and 4 were rejected under 35 U.S.C. § 103(a), as being unpatentable over the '741 patent in view of Sanders and the '647 patent; and claims 2, 5, and 6 were rejected under 35 U.S.C. § 103(a), as being unpatentable over the same combination in view of Tamata.

The '741 patent discloses a method for separating and recovering perfluorocompound gases employed in the semiconductor industry. The disclosed gas mixture is generated as an effluent in a stationary semiconductor manufacturing process plant and must be subjected to prior cleaning by a scrubber and a filter before it is supplied to the membrane step. The process of the '741 patent usually operates at substantially atmospheric pressure (see column 10, lines 39-50) or, alternatively, a compressor can be used for the feed stream (see column 10, lines 51+). However, no feed pressure is disclosed. Further, the '741 patent implies that all membranes, previously known for gas fractionation, are suitable. See columns 7-8. Finally, the process disclosed by the '741 patent accepts that SF₆ is partly decomposed under process conditions—recovery of highly concentrated SF₆ is not described nor is it an objective of the '741 patent. In contrast, the claims recite a mobile membrane separating apparatus including at least one membrane comprising a polymer matrix

composed of a polycarbonate made from a bisphenol in which at least 25% of the bisphenol units in the polymer chain are tetrahalogenated with chlorine or bromine. Additionally, the claims describe a process to produce highly concentrated SF_6 beginning with a membrane feed pressure of 10 to 13 bars without the use of a scrubber or filter.

Sanders discloses membranes for fractionating mixtures of hydrogen, oxygen nitrogen, carbon dioxide, etc. (see column 3, lines 40 to 48). Thus, the membrane disclosed by Sanders is directed to separating gases having similar diameters as is shown in the table below, which provides size information for a variety of disclosed gases.

| Gas mixture | Diameter (nm) |
|---------------|------------------|
| H_2 | 0.218 |
| O_2 | 0.254 |
| N_2 | 0.258 |
| CO_2 | 0.319 |
| CH_4 | 0.358 |

However, Sanders does not disclose or suggest that the disclosed membrane is suitable for separating mixtures of SF_6 and nitrogen. Moreover, because SF_6 has a diameter of 0.505 nm, and is substantially larger than the gases disclosed by Sanders, it would not have been obvious that Sanders' membrane would have been suitable for separating SF_6 from nitrogen. Furthermore, during the separation of oxygen and nitrogen in the process disclosed by Sanders, oxygen is separated as permeate and nitrogen as retentate

(see column 15, lines 22 to 27). According to the claims, nitrogen is not the retentate, rather it is separated with the permeate. Thus, Sanders fails to disclose nitrogen as the retentate and that the disclosed process is suitable for separating SF₆ from nitrogen.

The '647 patent discloses a stationary gas separation plant for treating waste SF₆ from a magnesium smelting plant using any known suitable membrane. (See column 4, lines 53+.) The specification provides examples having a maximum disclosed pressure of 9 bars, which is outside of the claimed pressure range. Thus, the '647 patent fails to disclose employment of the claimed membrane in the claimed pressure range in a process employing a mobile membrane separating apparatus.

Therefore, the combined teachings of the '741 patent, Sanders, and the '647 patent do not disclose or suggest the claimed invention, and Tamata does not cure the deficiencies. The combination does not disclose a process employing a specific membrane, at a feed pressure of 10 to 13 bars, for separating mixtures of SF₆ and nitrogen from gas insulated lines where nitrogen is obtained as the permeate, and may be readily discharged to the atmosphere, and SF₆ is separated as retentate, and is processed in such a highly concentrated form that it may be used once again. Moreover, the recitation of a mobile membrane separating apparatus and the specific limitations of claim 4 are not addressed by the references or the office action. It is respectfully requested that the rejection of claims 1-6 be withdrawn.

If the prosecution of this application can be advanced by a telephone conference, the Examiner is requested to call the undersigned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #173/50483).

Respectfully submitted,

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J. D. Evans
Registration No. 26,269

W. Jackson Matney, Jr.
Registration No. 39,292

CROWELL & MORING, LLP
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 624-2500
Facsimile No.: (202) 628-8844

MARKED-UP VERSION TO SHOW CHANGES

IN THE CLAIMS

Please amend claims 3-7 as follows:

3. (Amended) A process according to claim 1, wherein said membrane separator comprising at least one separating membrane comprises at least two separating membrane stages.

4. (Amended) A process according to claim 3, wherein said membrane separator comprising at least two separating membrane stages comprises three separating membrane stages, the retentate of the first membrane stage is fed to the second membrane stage in order to obtain a mixture with a high SF₆ content as retentate from the second membrane stage; the permeate of the first membrane stage is introduced into the third membrane stage; the permeate of the second membrane stage and the retentate of the third membrane stage are recirculated to the feed stream of the first membrane stage, and the permeate of the third membrane stage can be released into the environment.

5. (Amended) A process according to claim 1, wherein the process is utilized during the use of [the] a gas insulated line to purify [the] an insulating gas mixture of SF₆ and N₂.

6. (Amended) A process according to claim 1, wherein the process is utilized after completed use of [the] a gas insulated line in order to recover SF₆ prior to disposal of the used gas insulated line.

7. (Amended) A system comprising a gas insulated line, a membrane separation apparatus and at least one [one] connecting line between the gas insulated line and the membrane separation apparatus, wherein said separation apparatus is a mobile membrane separation apparatus.